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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,331	11/07/2005	Hiroshi Asami	075834.00424	5772
33448 7590 12/12/2007 ROBERT J. DEPKE LEWIS T. STEADMAN ROCKEY, DEPKE & LYONS, LLC SUITE 5450 SEARS TOWER CHICAGO, IL 60606-6306			EXAMINER HESS, MICHAEL THOMAS	
			ART UNIT 3729	PAPER NUMBER
			MAIL DATE 12/12/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/523,331	ASAMI ET AL.	
	Examiner	Art Unit	
	Michael T. Hess	3729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-10, 24-26 and 28-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-10, 24-26 and 28-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Objections*

1. Claim 4 is objected to because of the following informalities: Claim 4, Lines 3-5 recites "said pattern forming step includes a step of, after said conductor pattern forming step, a step of burying..." There are two "a step of" phrases, one before the commas and one after the commas, only one is needed. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 2, 8, 24, 26, 28 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 2, Lines 3-5 recite the limitation "said transfer sheet and said dissolvee metal layer are layered so as to be separable with respect to said metal base material." However, Claim 1, which Claim 2 depends from, Lines 8-10 recite "providing a transfer sheet comprising a metallic base and a dissolvee metal layer over the metallic base." The limitation of Claim 2 seems to state that the transfer sheet and dissolvee metal layer are two separable pieces that can exist on their own, but Claim 1 already says that the dissolvee layer is a part of the transfer sheet. This creates ambiguity as to the relationship between the transfer sheet, dissolvee metal layer and metallic base.

Therefore, Applicants have failed to particularly point out and distinctly claim the subject matter regarded as the invention.

NOTE: IN VIEW OF THE 35 U.S.C. § 112, ¶ REJECTION ABOVE, CLAIMS 2, 8, 24, 26, 28 AND 29 HAVE BEEN REJECTED ON PRIOR ART AS BEST UNDERSTOOD BY THE EXAMINER.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-3, 5, 6, 8-10, 26, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in the section titled

BACKGROUND ART in view of U.S. Patent No. 4,604,160 to Murakami, et al.  
(Murakami).

In Reference to Claims 1-3 and 5, 6, 8-10, 26, 29

The AAPA teaches:

a method for manufacturing a device incorporated substrate having an insulating layer, a conductor pattern thereon, a void section formed therein, and an electric device housed in said void section and connected to said conductor pattern, said method comprising (Figs. 13A-13F):

providing an insulating layer (Ref. # 31);

a void section (Ref. # 32) forming step of forming a void section (Ref. # 32) in said insulating layer (Ref. # 31, see P. 2, Lines 30-31) and forming through holes (Ref. # 33) and said filling through holes with conductive material (PP. 2-3, Lines 31-3);

providing a transfer sheet (Ref. # 34), the transfer sheet (Ref. # 34) being formed separate from, and un-connected to, said insulating layer (Ref. # 31, Fig. 13B);

a pattern forming step (Ref. # 13B, P. 3, Lines 3-4) of forming a conductor pattern (Ref. # 35) over one surface of said transfer sheet (Ref. # 34);

a pattern transfer step (Fig. 13D) of adhering said transfer sheet (Ref. # 34) and said insulating layer (Ref. # 31) to each other with said conductor pattern therebetween (Fig. 13D, PP. 2-3);

a transfer sheet removal step (Fig. 13E) for removing said transfer sheet (Ref. # 34) from at least said conductor pattern (Ref. # 35);

a device housing step (Figs. 13C-13E, transfer sheet 34 is adhered to insulating layer 31) of housing said electric device (Ref. # 36) within said void section (Ref. # 32), with said electric device (Ref. # 36) connected to said conductor pattern (Ref. # 35, Fig. 13D, electric device 32 is in void section 32 and is connected to conductor pattern 35);

layering said formed device-incorporated substrates multiply with electric connection at said through hole, after said step of filling conductive material (Fig. 13F, showing after said step of filling conductive material; P. 2, Lines 19-21 for having multi-layers of device-incorporated substrates); and

wherein said pattern transfer step occurs (Fig. 13D) after said pattern forming step (Fig. 13B) and said transfer sheet removal step (Ref. # 13E) occurs after said pattern transfer step (Ref. # 13D).

However, the AAPA fails to teach:

providing a transfer sheet comprising a metallic base and a dissolve metal layer, that is less than 5 micrometers, over the metallic base; and

wherein neither the metallic base nor the dissolve metal layer of the transfer sheet is removed prior to said transfer sheet removal step, and said transfer sheet removal step includes dissolving and removing at least a part of said transfer sheet,

wherein removal of said transfer sheet includes a step of separating and removing said metallic base from said dissolve metal layer by a physical method, and a step of dissolving and removing the remaining dissolve metal layer,

wherein said pattern forming step is done by an electroplating method,

wherein said dissolve metal layer and said conductor pattern are made of different metal material, and said step of dissolving and removing said dissolve metal layer is done by using an etching which is able to dissolve said dissolve metal layer but is unable to dissolve said conductor pattern.

Murakami teaches:

providing a transfer sheet (Ref. #s 1 and 6, in combination) comprising a metallic base (Ref. # 1) and a dissolve metal layer (Ref. # 6, Col. 5, Lines 17-18, discusses a range of 1-10 micrometers for the dissolve layer 6, see MPEP 2144.05 – Overlap of Ranges) over the metallic base (see Fig. 5), so that said metallic base and said dissolve metal layer are separable (see Figs. 5(e) and 5(f)); and

wherein neither the metallic base (Ref. # 1) nor the dissolve metal layer (Ref. # 6) of the transfer sheet (Ref. #s 1 and 6, in combination) is removed prior to said transfer sheet removal step (see Figs. 5(e)-(g), neither the metallic base 1 nor the dissolve metal layer 6 are removed until after the pattern transfer step of transferring to layers 4 and 5, which is when the transfer sheet removal step is to occur), and said transfer sheet removal step includes dissolving and removing at least a part of said transfer sheet (Col. 2, Lines 12-13; see Cols. 5-6, Lines 64-3 and Fig. 5), and

wherein removal of said transfer sheet (Ref. #s 1 and 6, in combination) includes a step of separating and removing said metallic base (Ref. # 1) from said dissolve metal layer by physical process (Ref. # 6, Fig. 5(e)-(F), Col. 2, Lines 9-11, any separation must be a physical process), and a step of dissolving and removing the remaining dissolve metal layer (Ref. # 6, Fig. 5g, Col. 2, Lines 12-13),

wherein a pattern (Ref. # 3) is formed on the transfer sheet (Ref. #s 1 and 6, in combination) by an electroplating process (Col. 2, Lines 7-9), and

wherein said dissolve metal layer (Ref. # 6) and said conductor pattern (Ref. # 3) are made of different metal material (Col. 5, Lines 25-29, discussing making metallic film 6 from a different material than conductor pattern 3), and said step of dissolving and removing said dissolve metal layer is done by using an etching (Col. 4, Lines 35-37) which is able to dissolve said dissolve metal layer but is unable to dissolve said conductor pattern (Col. 5, Lines 28-29, discussing how the etchant can dissolve the dissolve layer 6, but not the conductor layer 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the explicitly taught steps of plating a metal transfer sheet; transferring the plated pattern to a substrate, and removing the transfer sheet through dissolving as in Murakami, in order to produce extremely thin, highly accurate and delicate printed boards, which have high circuit density (Murakami, Col. 3-4, Lines 68-3).

#### In Reference to Claim 5

The AIPA in view of Murakami teaches:

the method for manufacturing a device incorporated substrate as described in Claim 1 (see 35 U.S.C § 103(a) rejection of Claim 1 above), characterized in that:

an adhesive material (Murakami, Ref. # 4) is applied over one surface of said insulating layer prior to said pattern transfer step (Murakami, Col. 2, Lines 17-20, Col. 5,



Lines 58-60), in order to aid in the adhesion of said patterned conductor (Murakami, Ref. # 3) to the insulating layer (Murakami, Ref. # 5).

However, the AAPA in view of Murakami fails to teach:

the adhesive material being subjected to the same void forming step as the insulating layer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the adhesive material prior to the void forming step of the AAPA in view of Murakami because it is one of two times at which the adhesive could have been applied to the insulating layer, before the void forming step or after the void forming step. Therefore, it would have been obvious to attempt applying the adhesive material to the insulating layer prior to the void forming step. Further, it would have been obvious to apply the adhesive material to the insulating layer before the void forming step in order to assure that the adhesive is only applied to top of the insulating layer and not the inside edges of the void section.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Murakami and further in view of U.S. Patent No. 6,977,348 to Ho et al. (Ho).

In Reference to Claim 4

The AAPA in view of Murakami teaches:

The method of manufacturing a device-incorporated substrate as described in claim 1 (see 35 U.S.C. § 103(a) rejection of Claim above).

However, the AAPA in view of Murakami fails to teach:

said pattern forming step includes a step of, after said conductor pattern forming step, of burying an insulating material in the gaps in said formed conductor pattern and subsequently flattening the surface of said transfer sheet such that the surfaces of the conductor pattern and the insulating material are substantially flush.

Ho teaches:

after said conductor pattern forming step (Col. 5, Line 27), a step of burying an insulating material (Ref. # 308, Figs. 3D) in the gaps in said formed conductor pattern (Ref. # 304a, Fig. 3d) and the insulating material (Ref. # 308) is substantially flush (Fig. 3D) in order to insulate the conductor pattern.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used insulating material burying step of Ho in the pattern forming step of the AAPA in view of Murakami in order to insulate the conductor pattern as implicitly taught by Ho.

Further, it would have been obvious to one having ordinary skill in the art at the time the invention was made, as a matter of design choice, to have subsequently flattened the surface of the transfer sheet so that the conductor pattern and insulating layer are at the optimal heights with respect to one another as it appears the invention of Ho would work equally well and Applicants have not stated that flattening the conductive pattern and insulating material solves a stated problem in the art.

8. Claims 24 and 28 rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Murakami and further in view U.S. Patent No. 6,532,651 to Andou et al. (Andou).

In Reference to Claims 24 and 28

The AAPA in view of Murakami teaches:

The method of manufacturing a device-incorporated substrate as described in claim 2 (see 35 U.S.C. § 103(a) rejection of Claim 2 above).

However, the AAPA in view of Murakami fails to teach:

said transfer sheet further comprises a heat foaming adhesive resin layer formed between said metallic base and said dissolve metal layer.

Andou teaches:

said transfer sheet further comprises a heat foaming adhesive resin layer (Ref. # 24) formed between said metallic base and said dissolve metal layer (Col. 16, Lines 21-43, discussing activating foaming adhesive agent by heating).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the adhesive foaming agent of Andou in the method of manufacturing a device-incorporated substrate of the AAPA in view of Murakami in order to facilitate adhering the base material, whether PET or metal, to a film and the subsequent separation of the base material and film as implicitly taught by Andou.

9. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Murakami and further in view of U.S. Patent Application Publication # 2003/0178227 A1 to Matsunaga et al. (Matsunaga), previously of record as to Takakiro et al.

In Reference to Claim 25

The AAPA in view of Murakami teaches:

the method for manufacturing a device incorporated substrate as described in claim 1 (see 35 U.S.C. § 103(a) rejection of Claim 1 above).

However, the AAPA in view of Murakami fails to teach:

said transfer sheet is at least 100 micrometers thick in order to provide rigidity to the transfer sheet.

Matsunaga teaches:

said transfer sheet (Ref. # 1) is at least 100 micrometers thick (¶ [0113], Lines 1-3) in order to provide rigidity to the transfer sheet (Ref. # 1, ¶ [0113], Lines 3-7).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the thickness suggestions for the transfer sheet as in Matsunaga in the method of manufacturing a device-incorporated substrate of the AAPA in view of Murakami in order to have a properly rigid transfer sheet as explicitly taught by Matsunaga.

10. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over the AAPA in view of Murakami and further in view of Japanese Pub. No. 05-055758 to Matsushita Electric (Matsushita), machine translation already of record.

In Reference to Claim 30

The AAPA in view of Murakami teaches:

the method for manufacturing a device incorporated substrate as described in claim 1 (see 35 U.S.C. § 103(a) rejection of Claim 1 above).

However, the AAPA in view of Murakami fails to teach:

wherein said device housing step includes a seal step of forming a seal resin layer between said conductor pattern and said electric device.

Matsushita teaches:

wherein said device housing step includes a seal step (§ [0009], Lines 6-8) of forming a seal resin layer (Ref. # 2a) between said conductor pattern (Ref. # 3) and said electric device (Ref. # 4).

It would have been obvious to one having ordinary skill in the art at the time of the invention to have used the explicitly taught use of a seal resin layer between the conductor pattern and the electric device to enhance the productivity of the multilayer boards (see Matsushita, § [0007]).

### ***Response to Arguments***

11. Applicant's arguments filed 11/05/2007 have been fully considered but they are not persuasive.

#### **Amended Claims in Response to Examiner's Objections**

Applicants argue that the amendments to the claims are to obviate Examiner's objections. However, Examiner did not make any Objections in the Final Office Action dated 06/26/2007, which is the most recent Office Action.

#### **Arguments Regarding Claim 1, 2, 4 and Murakami**

Applicant's arguments with respect to claims 1-6, 8-10, 24-26 and 28-29, regarding the Murakami reference have been considered but in view of the current amendments the arguments are moot in view of the new ground(s) of rejection.

Note: Figure 5 of Murakami clearly shows maintaining the metallic base structure (Ref. #s 1 and 6) until after the conductor pattern is transferred, see 35 U.S.C. § 103(a) rejections above.

Arguments Regarding Claim 8 and Murakami

Applicants argue that on Col. 5, Lines 25-27 Murakami "clearly teaches that the metallic film should be formed of the same material as the conductor." However, as the sentence of Murakami continues "or some other material more susceptible to removal by etching" it is clear that Murakami contemplates and teaches the use of a different conductive material for the specific purpose of facilitating etching of the dissolve layer. Therefore, Applicants' argument regarding claim 8 would fail even without the new grounds of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael T. Hess whose telephone number is 571-270-1994. The examiner can normally be reached on M-Th, 6:30AM-5:00 PM.

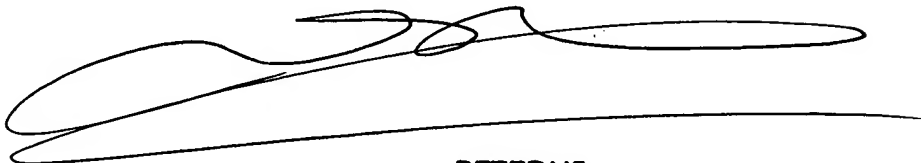
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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MTH MTH 12.10.07



**PETER VO**  
**SUPERVISORY PATENT EXAMINER**  
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